

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

14-196PCT

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/319438
NEW

INTERNATIONAL APPLICATION NO.

PCT/GB98/00203

INTERNATIONAL FILING DATE

23 January 1998

PRIORITY DATE CLAIMED

24 January 1997

TITLE OF INVENTION

NON-WOVEN INORGANIC FIBRE MAT

APPLICANT(S) FOR DO/EO/US

WALTERS, John; FITZSIMONS, Jocelyn

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)) (**appln. enc. W0 98/32579**)
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(3)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98./International Search Report
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

- 1.) International Preliminary Examination Report (PCT/IPEA/409) w/Amended Claims
- 2.) PCT Request (PCT/RO/101)
- 3.) Three (3) Sheets of Formal Drawings

U.S. APPLICATION NO. <small>(known, see 37 CFR 1.5)</small> <div style="text-align: center; font-weight: bold;">NEW</div>		INTERNATIONAL APPLICATION NO. <div style="text-align: center;">PCT/GB98/00203</div>		ATTORNEY'S DOCKET NUMBER <div style="text-align: center;">14-196PCT</div>	
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17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$970.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. \$760.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). \$96.00 ENTER APPROPRIATE BASIC FEE AMOUNT =	CALCULATIONS PTO USE ONLY																										
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	\$	840.00																									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:20%;">CLAIMS</th> <th style="width:20%;">NUMBER FILED</th> <th style="width:20%;">NUMBER EXTRA</th> <th style="width:20%;">RATE</th> <th style="width:20%;"></th> </tr> <tr> <td>Total Claims</td> <td>11 - 20 =</td> <td>-----</td> <td>X \$18.00</td> <td>\$ -----</td> </tr> <tr> <td>Independent Claims</td> <td>4 - 3 =</td> <td>1</td> <td>X \$78.00</td> <td>\$ 78.00</td> </tr> <tr> <td colspan="3">MULTIPLE DEPENDENT CLAIM(S) (if applicable) None</td> <td>+ \$260.00</td> <td>\$ -----</td> </tr> <tr> <td colspan="4" style="text-align: right;">TOTAL OF ABOVE CALCULATIONS =</td> <td>\$ 918.00</td> </tr> </table>	CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		Total Claims	11 - 20 =	-----	X \$18.00	\$ -----	Independent Claims	4 - 3 =	1	X \$78.00	\$ 78.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable) None			+ \$260.00	\$ -----	TOTAL OF ABOVE CALCULATIONS =				\$ 918.00	\$	-----
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Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).	\$	-----																									
SUBTOTAL =	\$	918.00																									
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).	\$	-----																									
TOTAL NATIONAL FEE =	\$	918.00																									
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +	\$	40.00																									
TOTAL FEES ENCLOSED =	\$	958.00																									
	Amount to be: refunded	\$																									
	charged	\$																									

a. ☒ A check in the amount of \$ 958.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account. No. _____ in the amount of \$ _____ to cover the above fees.
 A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
 overpayment to Deposit Account No. 02-2448.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Send all correspondence to:
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Falls Church, VA 22040-0747
(703)205-8000

SIGNATURE

SLATTERY, JAMES M.

NAME

#28,380

REGISTRATION NUMBER

09/319438

510 Rec'd PCT/PTO 07 JUN 1999

PATENT
14-196PCT

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: WALTERS, John et al
Int'l. Appl. No.: PCT/GB98/00203
Appl. No.: New Group: Unknown
Filed: June 7, 1999 Examiner: Unknown
For: NON-WOVEN INORGANIC FIBRE MAT

PRELIMINARY AMENDMENT

BOX PATENT APPLICATION

Assistant Commissioner for Patents
Washington, DC 20231

June 7, 1999

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

AMENDMENTS

IN THE SPECIFICATION:

Please amend the specification as follows:

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/GB98/00203 which has an International filing date of January 23, 1998, which designated the United States of America.--

IN THE CLAIMS:

CLAIM 5: Line 1, change "claim 3 or 4" to --claim 3--

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CLAIM 7: Line 1, change "any of claims 3 to 6" to --claim 3--

CLAIM 10: Line 1, change "claim 8 or 9" to --claim 8--

CLAIM 11: Line 1, change "claim 8, 9 or 10" to --claim 8--

CLAIM 12: Line 1, change "any of claims 8 to 11" to --claim 8--

CLAIM 13: Line 2, change "claim 1 or 2" to --claim 1--

REMARKS

The specification has been amended to provide a cross-reference to the previously filed International Application.

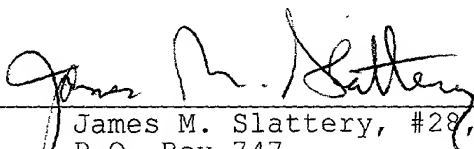
The amendment merely corrects the claims to place the application into better form prior to examination.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


James M. Slattery, #28,380
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(703) 205-8000

JMS/sas

(Rev. 03/30/99)

NON-WOVEN INORGANIC FIBRE MAT

This invention relates to a non-woven inorganic fibre mat such as a glass fibre mat and to a method and apparatus for the production thereof. It also relates to the use of the mat in building boards, such as gypsum building boards.

A particularly useful form of building board is known as glass reinforced gypsum board (GRG). GRG board and its manufacture is described in GB-A-2 053 779. GRG board is of generally conventional appearance and is composed of a gypsum with a non-woven glass mat immediately below one or both principal surfaces. The mat is introduced into the core by vibrating the core slurry, over- or underlain by the mat, to cause it to pass through the mat, so that the surface layer or layers of gypsum are integral with the core. GRG boards are stronger than conventional boards and exhibit superior fire resistance.

In the manufacture of GRG board the need to provide strength by employing non-woven glass fibre mat of relatively low diameter (for example, $13\mu\text{m}$) fibres conflicts with the need to ensure efficient exhaustion through the mat of air from the gypsum slurry from which the board is formed; this is a particular problem at the edge margins of the board where the bottom mat is brought up and onto the upper surface of the board to define the edges of the uncut board. Inefficient exhaustion of air in this region can lead to voids in the edge margins of the cut boards, reducing the edge strength of the boards.

The problem of voids in the edge margins has been dealt with by increasing the fibre diameter of the mat, particularly the bottom mat (to for example $16\mu\text{m}$), allowing easier exhaustion of air and penetration of gypsum slurry but reducing board strength. However, the use of higher diameter fibres has been found to decrease the strength of the mat. Reduction of the mat substance (weight/unit area), which would allow the gypsum slurry to

penetrate the mat more readily, would lead to an unacceptable reduction in board strength.

The need to allow sufficient time for the gypsum slurry to penetrate the mat means that the line speed of the plasterboard manufacturing line is lower than would be the case were adequate exhaustion of air from the edge margins easier.

It has been desired to provide a GRG building board which can be manufactured at relatively high speed, is of high strength by virtue of using a mat of relatively low diameter fibres and the edge margins of which have a low level of voids.

According to the invention there is provided a non-woven mat of inorganic fibre having a substance (weight/unit area) which varies in the cross direction.

Preferably, the edge margins are of lower substance than the remainder of the mat.

Also, according to the invention there is provided a method of making a non-woven mat of inorganic fibre having a substance which varies in the cross direction comprising:

passing a forming wire past a slurry of inorganic fibres in a liquid while masking a part of the width of the forming wire as it passes through the slurry, the masking varying along the length of the forming wire as it passes through the slurry; and

urging the slurry against the forming wire and causing the said liquid to pass through the forming wire, whereby a non-woven mat of inorganic fibre is formed having an uneven substance in the cross direction (the cross direction is the direction on the mat generally perpendicular to the direction in which the mat runs through the machine, which is the machine direction).

Also according to the invention there is provided apparatus for forming a non-woven mat of inorganic fibre having a substance which varies in the cross direction comprising:

a source of a slurry of inorganic fibre in a liquid;

a forming wire disposed to move past the said source, through which, in use, the said liquid passes to deposit the said

inorganic fibre on the forming wire;

a mask across a part of the width of the forming wire to hinder passage of the said liquid through the forming wire over the said part, the effectiveness of the mask varying in the direction of movement of the forming wire past the said source.

Preferably, the mask is disposed across portion of the forming wire corresponding to the edge margins of the formed mat.

Also preferably, the effectiveness of the mask decreases in the direction in which the forming wire is disposed to move.

Also preferably, the mask is a blinding plate impinging the face of the forming wire remote from the source of slurry.

Also preferably, the effective width of the blinding plate decreases in the direction in which the forming wire passes the slurry.

The invention also provides a cementitious board having a sheet of a non-woven mat of inorganic fibre according to the invention embedded immediately below at least one surface.

In a further aspect, the invention also provides a cementitious board having a sheet of a non-woven mat of inorganic fibre embedded immediately below at least one surface wherein the permeability of the mat to cementitious slurry varies across the mat.

The invention will be further described by way of example, with reference to the drawings in which:

Figure 1 shows, diagrammatically, a perspective view of an inclined wire glass fibre mat former embodying the invention;

Figure 2 shows a blinding plate for use in the apparatus and method of the invention; and

Figure 3 shows a cross sectional view through a glass fibre mat according to the invention.

The former shown in Figure 1 comprises a flowbox 10 containing an aqueous slurry of chopped glass fibre and conventional additives up to the level indicated by the broken line 12. The slurry is continuously supplied to the flowbox 10

from below. A continuous forming wire 14, shown transparent in Figure 1 for clarity, passes through the flowbox 10 at angle to the vertical and the horizontal in the direction shown by the arrow in Figure 1. Slurry is drawn through the wire 14 and into a suction box 16 by a conventional slurry pumping system to form a mat 18 of glass fibres on the wire. Shortly after leaving the flowbox 10, the forming wire 14 carrying the mat 18 of fibres passes over a vacuum header 20 which draws water from the mat 18. The mat 18 on the forming wire 14 then has adhesive applied to it and is dried and wound into a roll, in a conventional manner. The other rollers and the frame shown in Figure 1 are conventional.

Blinding plates 22,22', shown also in Figure 2, are placed in the flowbox 10 between the edge margins of the forming wire 14 and the suction box 16; the forming wire 14 passes across their surface. The blinding plates 22,22' are generally rectangular with a rectangular cut out 24,24' from their inside downstream (relative to the forming wire 14) corner. The presence of the blinding plates 22,22' as the wire starts to pass over the suction box 16 prevents the passage of slurry through the forming wire 14 in the region underlain by the blinding plates and so no glass fibres accumulate on the wire. As the wire 14 passes over the cut outs 24,24' from the blinding plates, slurry passes through the edge margins of the wire previously underlain by the blinding plates and glass fibre mat accumulates. The central portion of the forming wire 14 is not masked at all by the blinding plates 22,22', and so the glass fibre mat accumulates there throughout the passage of the forming wire over the suction box.

The effect of this differential accumulation of glass fibres is to make a mat having edge portions 26,26' of lower substance (weight/unit area) than the central portion 28. This may be seen in Figure 3. The substance of the edge margins 26,26' of the mat can be controlled by the size of the cut-outs 24,24' from the blinding plates 22,22' and the position of the blinding plates relative to the suction box 16. Factors such as the

concentration of fibres in the slurry, the speed of the forming wire and the speed with which the slurry is drawn through the forming wire, which generally affect the deposition of fibres on the wire and thus the substance of the mat will also affect the substance of the edge margins 26,26' of the mat 18.

Glass fibre mats according to the invention find particular application in the manufacture of GRG board, described in GB-A-2 053 779. The mat is introduced into the core by vibrating the core slurry, over- or underlain by the mat, to cause it to pass through the mat, so that the surface layer or layers of gypsum are integral with the core. The lower substance of the edge margins of the mats allow air trapped in the slurry to pass readily through the edge margins of the mat. This avoids the formation of undesirable voids in the edge margins of the board, improving edge strength. Preferred mats for this purpose are of 13 μm diameter glass fibres and have a central substance of about 60 g/m² and an edge margin substance of about 27 g/m².

Blinding plates of the invention may be of any desired size and shape to achieve the desired substance distribution across the width of the mat. They may be located at one or both edge margins of the forming wire 14, or one or more may be disposed across the width of the wire. The blinding plates may rest on the wire or be otherwise disposed over the wire but are preferably under it, between it and the suction box 16.

Instead of separate blinding plates, deposition of fibres on the forming wire can be inhibited by treating the wire itself, for example by painting over small areas in regions of the wire to be masked, so that less slurry passes through the wire in these regions, reducing the fibre deposition and thus mat substance. Alternatively, the weave of the forming wire can be made closer in some regions, again reducing the flow of slurry through these regions.

The mats of the invention allow the provision of GRG type plasterboard of improved strength especially at the edge margins.

Plasterboard having the same strength edge margins as current GRG boards can be manufactured at higher speeds than are currently possible.

CLAIMS

1. A non-woven mat of inorganic fibre having a substance (weight/unit area) which varies in the cross direction, the edge margins being of lower substance than the remainder of the mat.
2. A method of making a non-woven mat of inorganic fibre having a substance (weight/unit area) which varies in the cross direction , the edge margins being of lower substance than the remainder of the mat, comprising:
 - passing a forming wire past a slurry of inorganic fibres in a liquid while masking a part of the forming wire as it passes through the slurry, the said part corresponding to an edge margin of the formed mat and the masking varying along the length of the forming wire as it passes through the slurry; and
 - urging the slurry against the forming wire and causing the said liquid to pass through the forming wire, whereby a non-woven mat of inorganic fibre is formed having an uneven substance (weight/unit area) in the cross direction.
3. A method according to claim 2 in which the masking decreases in the direction in which the forming wire passes the slurry.
4. A method according to claim 2 or 3 in which the masking is achieved by passing the face of the forming wire remote from the slurry across a blinding plate as it passes the slurry.
5. A method according to claim 4 in which the effective width of the blinding plate decreases in the direction in which the forming wire passes the slurry.
6. Apparatus for forming a non-woven mat of inorganic fibre

having a substance (weight/unit area) which varies in the cross direction comprising:

a source of a slurry of inorganic fibre in a liquid;

a forming wire disposed to move past the source, through which, in use, the liquid passes to deposit the inorganic fibre on the forming wire;

a mask across the part of the width of the forming wire corresponding to the edge margins of the formed mat to hinder passage of the liquid through the forming wire over the said part, the effectiveness of the mask varying in the direction of movement of the forming wire past the source.

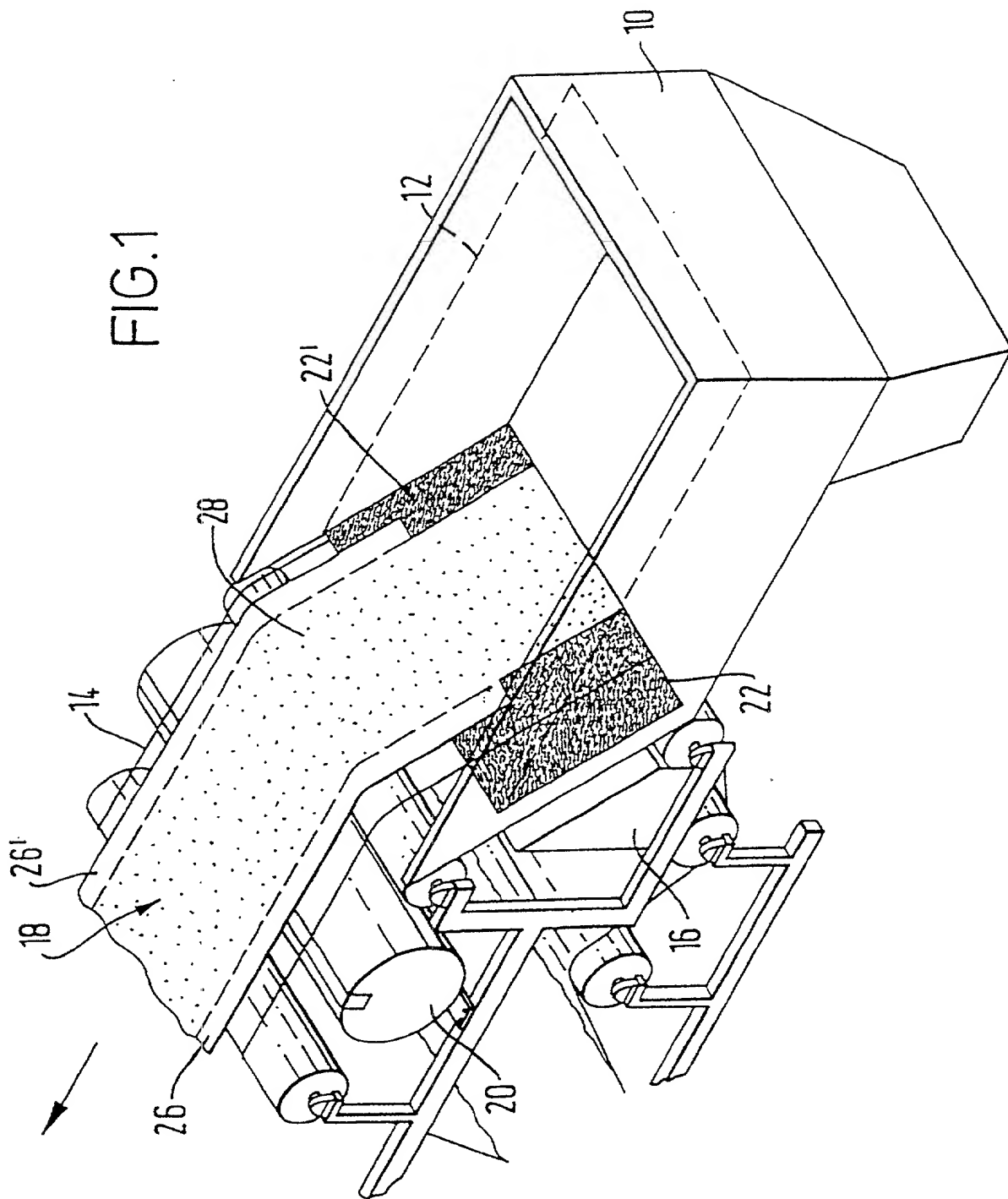
7. Apparatus according to claim 6 in which the effectiveness of the mask decreases in the direction in which the forming wire is disposed to move.

8. Apparatus according to claim 6 or 7 in which the mask is a blinding plate impinging the face of the forming wire remote from the source of slurry.

9. Apparatus according to any of claims 6, 7 or 8 in which the effective width of the blinding plate decreases in the direction in which the forming wire passes the slurry.

10. A cementitious board having a sheet of a non-woven mat of inorganic fibre according to claim 1 embedded immediately below at least one surface.

11. A cementitious board having a sheet of a non-woven mat of inorganic fibre embedded immediately below at least one surface wherein the permeability of the mat to cementitious slurry varies across the mat.



2/3

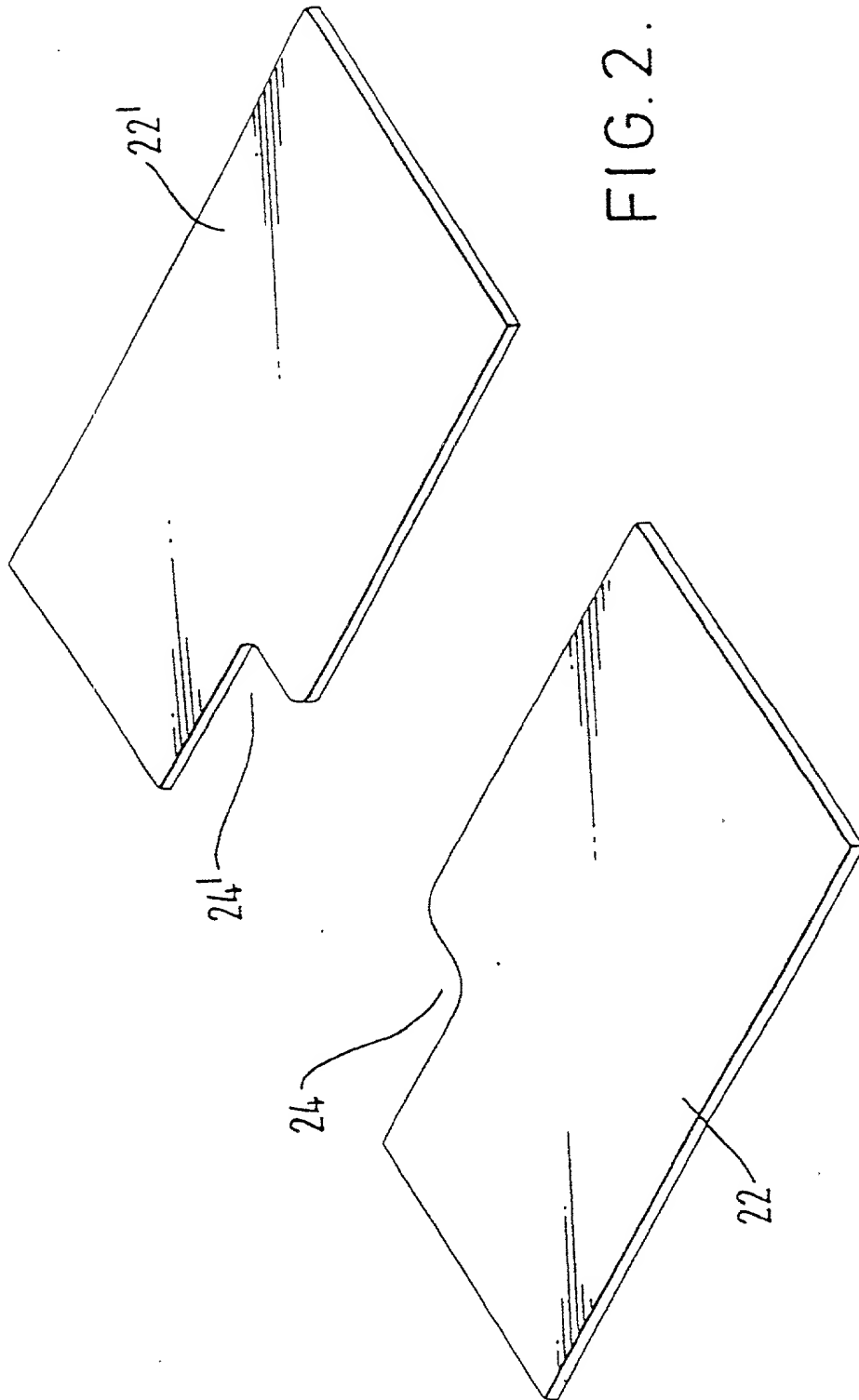
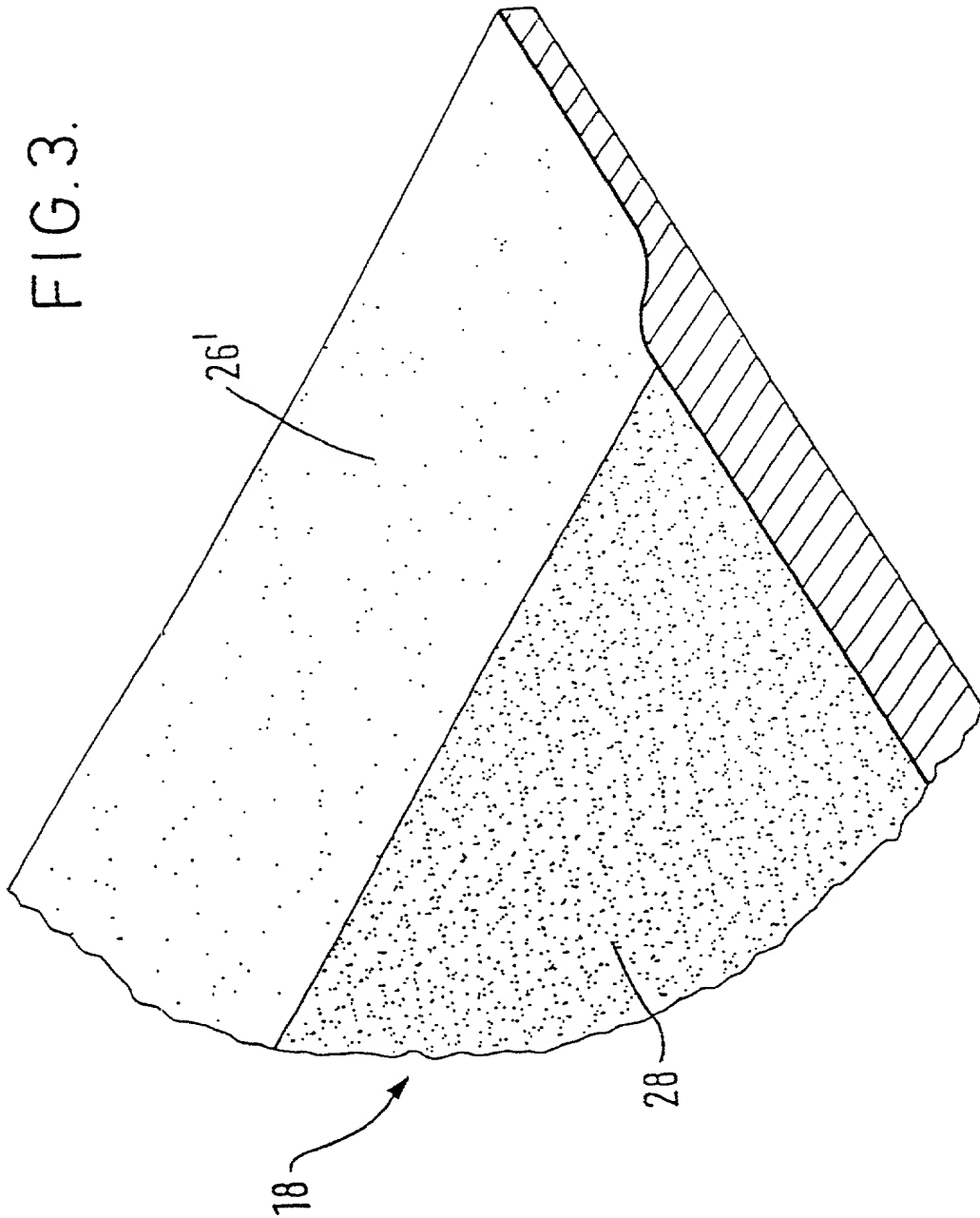


FIG. 3.



3/7/11

USA

(1)

BIRCH, STEWART, KOLASCH & BIRCH, LLP

P.O. Box 747 • Falls Church, Virginia 22040-0747
Telephone: (703) 205-8000 • Facsimile: (703) 205-8050

ATTORNEY DOCKET NO.
14-196P

PLEASE NOTE:
YOU MUST
COMPLETE THE
FOLLOWING:

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title: → NON-WOVEN INORGANIC FIBRE MAT

Fill in Appropriate
Information —
For Use
Without
Specification
Attached:

the specification of which is attached hereto. If not attached hereto,
the specification was filed on _____ as
United States Application Number _____;
and amended on _____ (if applicable); and/or
the specification was filed on January 23, 1998 as PCT
International Application Number PCT/GB98/00203; and was
amended under PCT Article 19 on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Insert Priority
Information: →
(if appropriate)

Prior Foreign Application(s)			Priority Claimed	
<u>9701500.2</u>	<u>UNITED KINGDOM</u>	<u>01-24-1997</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month / Day / Year Filed)		
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month / Day / Year Filed)		
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month / Day / Year Filed)		
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Month / Day / Year Filed)		

Insert Provisional
Application(s): →
(if any)

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.	
_____	_____
(Application Number)	(Filing Date)
_____	_____
(Application Number)	(Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Insert Requested
Information: →
(if appropriate)

Country	Application Number	Date of Filing (Month / Day / Year)
_____	_____	_____
_____	_____	_____

Insert Prior U.S.
Application(s): →
(if any)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:		
_____	_____	_____
(Application Number)	(Filing Date)	(Status — patented, pending, abandoned)
_____	_____	_____
(Application Number)	(Filing Date)	(Status — patented, pending, abandoned)

14-196P

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent base instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) assignee provides said attorneys with a written notice to the contrary:

Raymond C. Stewart	(Reg. No. 21,066)	Terrell C. Birch	(Reg. No. 19,382)
Joseph A. Kolasch	(Reg. No. 22,463)	James M. Slattery	(Reg. No. 28,380)
Bernard L. Sweeney	(Reg. No. 24,448)	Michael K. Mutter	(Reg. No. 29,680)
Charles Gorenstein	(Reg. No. 29,271)	Gerald M. Murphy, Jr.	(Reg. No. 28,977)
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Andrew D. Meikle	(Reg. No. 32,868)	Marc S. Weiner	(Reg. No. 32,181)
Joe McKinney Muncy	(Reg. No. 32,334)	C. Joseph Faraci	(Reg. No. 32,350)
Donald J. Daley	(Reg. No. 34,313)	John W. Bailey	(Reg. No. 32,881)
John A. Castellano	(Reg. No. 35,094)		

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PLEASE NOTE:
YOU MUST
COMPLETE
THE
FOLLOWING:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or
Sole Inventor:
Insert Name of
Inventor
Insert Date This
Document is Signed

Insert Residence
Insert Citizenship

Insert Post Office
Address

Full Name of Second
Inventor, if any:
see above

Full Name of Third
Inventor, if any:
see above

Full Name of Fourth
Inventor, if any:
see above

Full Name of Fifth
Inventor, if any:
see above

GIVEN NAME	FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
John	WALTERS	<i>[Signature]</i>	16/3/99
Residence (City, State & Country)		CITIZENSHIP	
West Yorkshire, WF10 SAG, United Kingdom		GBX British	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			
29 Roundhill Road, Castleford, West Yorkshire WF10 SAG, United Kingdom			
GIVEN NAME	FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Jocelyn	FITZSIMONS	<i>[Signature]</i>	4 May 99
Residence (City, State & Country)		CITIZENSHIP	
Georges Quay, Cork, Ireland		IRX Irish	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			
24 Margret Street, Georges Quay, Cork, Ireland			
GIVEN NAME	FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			
GIVEN NAME	FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			
GIVEN NAME	FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP	
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)			

* DATE OF SIGNATURE